



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:  
Sisson et al.

For: Article Comprising Light Absorbent  
Composition to Mask Visual Haze and Related  
Methods

Serial No. 10/769,167

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) Art Unit: 1772  
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) Examiner: Charles Dooner  
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) I hereby certify that this correspondence is  
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) and Trademark Office on  
) Feb 25, 2006.

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DECLARATION OF DR. KEVIN L. ROLICK

I, Kevin L. Rollick, PhD, hereby declare that:

1. I am a resident of Monroe Falls, Ohio and am employed as a Senior Research Scientist at M&G Polymers, USA. I am not an inventor of the subject matter disclosed or claimed in the subject patent application.

2. My educational background includes a Bachelor of Science from Indiana University of Pennsylvania (cum laude, 1975); and a PhD in Organic Chemistry and minor in Inorganic Chemistry from Indiana University at Bloomington, Indiana (cum laude, 1981).

3. I am a named inventor in 13 United States letters patents, six of which relate to the field of polyester polymers. Four of the six patents relate to the foaming of polyester to produce heat resistant crystallized polyester trays.

4. I have been employed by M&G Polymers USA, LLC, The Goodyear Tire & Rubber Company and Shell Oil Company for approximately 24 years and have worked in the field of

polymer resins for thirteen years. I am presently a Senior Research Chemist at M & G Polymers USA, LLC's research facility located in Sharon Center, Ohio.

5. I have authored or co-authored seven technical papers, one of which was awarded the Best Paper Award at the Rubber Division of the American Chemical Society (1988).

6. For five years I was a member of the tray research team and am very familiar with the types of polymers used in sheet and tray manufacture and their processes.

7. I am also named inventor in two pending applications before the United States Patent and Trademark Office regarding a novel treatment of iron particles as scavengers and the special combinations of electrolytes and acidifying agents.

8. I have also conducted extensive research and trial on activating nylon, in particular, with MXD-6 to react with oxygen using various cobalt salts.

9. For three years, I was in charge of the analytical laboratory at M&G Polymers. These tests included measurement and analysis of light, color, visible light, haze and other spectra. I am very familiar with the analysis of MXD-6 domains in unoriented bottle preforms and oriented stretch blow bottles.

10. I have reviewed United States Publication No. 2002/0001684 to Kim et al and conclude that Kim et al does not explicitly or inherently disclose a thermoplastic matrix with incompatible domains lying in the region of 380-720 nm. I base this on the conclusion that the phrase "increases in size up to the wavelength of light" at paragraph 23, lines 13-15 means to keep the domains less than the minimum wavelength of visible light (380nm). This understanding is based upon the fact the one of ordinary skill knows that there is no such thing as one wavelength of light because:

A) the term light refers to a group of wavelengths along a spectrum of wavelengths and ranges from 20nm to 1,000  $\mu\text{m}$ . This spectrum includes the far Ultra Violet (UV) (10-200nm), near UV (200-380nm)<sup>1</sup>, Visible Light (380-750nm),

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<sup>1</sup> UVA is 315 nm – 380 nm and is also known as the blacklight region.

and Near Infrared 750 to 3,000nm, Short IR (3000-6000nm), long IR (6000-15,000nm) and far IR (15,000 to 1,000,000nm)<sup>2</sup> and

B) it is commonly understood that the wavelength of a given region is therefore any wavelength in that region.

C) The common usage of the word light refers to visible light spectrum, in particular “wavelength of light”.

D) Therefore, the phrase “wavelength of light” means any wavelength of light in the visible region. Therefore, when Kim et al teaches that the MXD-6 domains increases in size up to less than the wavelength of light (Page 23, lines 15-16), Kim et al is teaching to increase the domains to less than approximately 380 to 380nm.

11. Likewise the phrase “greater than the wavelength of light” means that the domains are greater the maximum wavelength of visible light. Kim et al does not disclose domains in the visible region when discussing the cause of the haze. In fact, Kim et al is quite clear that haze is caused by the domains being greater than the wavelength of light and refers to the data in Table I as support. Table I discloses the unoriented thermoplastic with domains of 0.1 to 0.3 micron (100-300nm) and a hazier oriented thermoplastic having a 9 drawdown ratio with domains of 1 to 2 microns or 1,000 to 2,000 nm. Consistent with Kim et al’s teachings, domains of 1,000 to 2,000 microns are greater than the wavelength spectra of visible light (380-720) nm.

12. I also conclude that Kim et al teaches to keep the domains small and out of the visible region of 380-720nm. I base this conclusion on two independent reasons.

A) First, as discussed in point 10 the phrase keeping domains below the “wavelength of light” means keeping the domains below any wavelength in the visible region (<380-380nm).

B) Second the use of the extrusion blow process to keep the haze down teaches low stretch containers. It is well known to those of ordinary skill in the art that the extrusion blow process has substantially lower stretch and orientation than the stretch blow process. The

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<sup>2</sup> Kirk-Othmer Encyclopedia of Chemical Technology, 3<sup>rd</sup> Ed. Vol 13, pg 337.

reheat stretch blown bottle of Kim et al is hazy, the extrusion blow bottle is not. Kim et al specifically notes the extrusion blow as a low stretch process. It is therefore my conclusion that Kim et al teaches to eliminate the haze caused by domains greater than the wavelength of light by keeping the stretch of the unoriented material low enough so that the domains are below any wavelength in the visible region (<380-720nm).

13. I have also compared the examples of Table 1 with Tables 2 and 3 of Kim et al and without specific analysis of those bottles, I cannot determine whether the reheat blown bottle of Tables 2 and 3 have domains in the region of 380-720nm as required the Examiner's argument in the Office Action.

(A) The Extrusion Blow Bottle: I can conclude that the domains in the extrusion blown bottle are less than 380 nm based upon the haze value. Kim et al teaches that there is limited haze when the domains are less than up to the wavelength of light and refers to Table 1 as an example. The haze of the unoriented article in Table 1 is 0.2 % Haze per mil with domains between 0.1 and 0.3 micron (less than 380nm, 0.38 micron). The haze of the extrusion blown bottles in Table 2 is equal to or less than the unoriented article, which leads me to conclude that the size of the domains in the extrusion blow bottle are also less than the wavelength of light, like the unoriented article in Table 1.

(B) The Injection Reheat Blown Bottle: As stated earlier, I cannot determine whether the injection reheat blown bottle of Tables 2 and 3 have domains in the region of 380-720 nm. However, according to Kim et al, the cause of the haze is domains greater than the wavelength of light and again Kim et al refers to Table 1 where the domains of the 9 orientation drawdown has domains from 2 to 3 micron (2,000 to 3,000 nm) which is greater than the wavelength of light and a haze of 0.8 % per mil. Given that the injection reheat blown bottle has haze of 3.16 % per mil, based upon the teachings of Kim et al I can conclude that the injection reheat blown bottle has domains greater than the wavelength of light. However, nothing in Kim et al would cause me to conclude that any of the examples have domains between 380 and 720 nm.

(C) The two preceding conclusions are consistent with my experience. In my experience, I have observed the analysis of domains in many performs and bottles. Consistent with what is known in the art, the domain size and distribution is a function of the shear and interfacial tension. For a fixed interfacial tension, more shear generates smaller

domains and less shear generates larger domains. Accordingly, I have seen embodiments of the present invention work under one set of shear and stretch conditions, yet the same composition, same color and same amount of color fail under a different set of shear and stretch conditions. Subsequent analysis demonstrated that the domain distribution had shifted so there were more domains in the weaker absorbing part of the spectra. This was corrected by adding more color or slightly modifying the colorant. Therefore the size of domains or their distribution within the matrix cannot be determined unless there is a direct measurement of the domains in the matrix.

14. I am also very familiar with the use of amber colorants in the present invention and I can state unequivocally that I have seen some ambers which work and other ambers which fail miserably. The ambers which worked were those that absorbed enough light at the wavelengths corresponding to the domains.

15. Based upon my analysis, I provide the following Table which graphically portrays the domains disclosed by Kim et al.

Up to Less Than the Wavelength of Light		Wavelength of Light		Greater Than The Wavelength of Light	
< 380 nm		380	–	720nm	> 720nm
0.1 to 0.3 micron	Table 1	Not found		1 to 2 micron	Table 1
Eliminates Haze				Causes Haze	

16. I can also conclude that the salt of Kim et al is not present as a separate domain. I am very familiar with the blending of the Cobalt Salts used in Kim et al. These salts are soluble in PET and Nylon and therefore are not present as separate domains.

17. I am also familiar with the type of color causing reaction noted in Kim et al at paragraph 50, lines 6-9. This type of color causing reaction is a darkening due to the precipitation of the antimony or other metal catalyst in the polyester by the phosphite stabilizer in the MXD-6 nylons. I have directly observed this type of color when blending MXD-6 with polyester. The color is not green, yellow, or blue, but is a graying or darkening of the article.

18. I am also very familiar with work done trying to determine whether certain amber colorants would mask haze or not. What ended up actually working was an amber colorant

which absorbed up to 650nm and then started to decrease its absorbance. This is not the amber described in Weaver et al. I can easily conclude that the ambers of Weaver et al are not likely to mask the haze when there are a substantial number of domains present between 550 and 720 nm.

19. I declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the U.S. Code and that such willful false statements may jeopardize the validity of this application and any patent issuing thereon.

Respectfully

Submitted, February 23, 2006

  
Kevin L. Rollick, PhD